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Beam steering using the active element pattern of antenna array

(Article)

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Abstract

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An antenna array is a set of a combination of two or more antennas in order to achieve improved performance over a single antenna. This paper investigates the beam steering technique using the active element pattern of dipole antenna array. The radiation pattern of the array can be obtain by using the active element pattern method multiplies with the array factor. The active element pattern is crucial as the mutual coupling effect is considered, and it will lead to an accurate radiation pattern, especially in determining direction of arrival (DoA) of a signal. A conventional method such as the pattern multiplication method ignores the coupling effect which is essential especially for closely spaced antenna arrays. The comparison between both techniques has been performed for better performance. It is observed that the active element pattern influenced the radiation pattern of antenna arrays, especially at the side lobe level. Then, the beam of the 3×3 dipole antenna array has been steered to an angle of 60° using three techniques; Uniform, Chebyshev and Binomial distribution. All of these are accomplished using CST and Matlab software. © 2018 Universitas Ahmad Dahlan.

Author keywords

Active element pattern (AEP) | Beam steering | Dipole antenna array | Edge effect | Pattern multiplication

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